

our knowledge as to the pathogenicity of the organism were the following known:

1. The incidence in the stool of normal children.
2. The variability in stools of normal children and those giving symptoms.
3. Comparison of effect of therapy (arsenic, antimony, etc.), in those patients with these varying symptoms with *and* without the parasite in the stools.

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DOCTOR McCLENDON (Closing).—This paper was presented as a report of our experience in a series of cases of twenty-two children in whom a giardia infestation was found. In these children there were no physical or laboratory findings to account for the symptoms presented other than the presence of giardia in the stools. It seems to us, therefore, rather more than a coincidence that these patients were not only benefited by the treatment, but were at the same time relieved of their giardia infestation, as subsequent stool examinations have shown. We appreciate the fact that enthusiasm may cause us to be strongly biased on the question of the pathogenicity of this organism. On one side of the question we have the opinion of Doctor Gunn, who has maintained for many years his belief in the nonpathogenicity of this organism, and on the other we have the attitude of equally keen observers who believe that the organism is pathogenic. Our experience with this series of twenty-two patients leads us to agree with this latter group and to regard giardia as one of the pathogenic types of protozoa.

CHYLOTHORAX*

REPORT OF CASE

By ROSCOE G. VAN NUYS, M.D.
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DISCUSSION by Robert A. Glenn, M.D., Oakland; Robert S. Stone, M.D., San Francisco.

UNUSUAL pathology and conditions of obscure etiology always hold our interest. It has happened to most of us that we have never been alert to certain pathological changes until some author has called the same to our attention.

REPORT OF CASE

Since the patient, Dr. H., is a physician, who was referred to us by Dr. W. H. Crane, his own story will be presented as he gave it.

Age, thirty-nine years. Birthplace, British West Indies.

Grandparents long-lived; cause of death unknown. Mother died in early thirties of heart disease; no knowledge of cancer, tuberculosis, or any specific disease in the family. Had measles in early childhood. Malaria first contracted in early childhood, with recovery. It recurred at twenty-one years of age while living in Panama. This impaired my health for a year or more and was accompanied by digestive disturbances at irregular intervals. Had varicocele on left side at age of fourteen, which seemed to have started soon after a blow while wrestling with another boy. This was operated upon several years later. Also had influenza. After the attack my ability for athletics was somewhat impaired. In the summer of 1922 while attending medical school I had after-

noon fever for six weeks. The possibility of tuberculosis was considered, but physical examination and x-ray did not reveal enough to justify a diagnosis of that disease. Because of malarial history, quinin was given. The slight fever left suddenly after six weeks and school work was continued without difficulty, though not without effort. Negative to gonorrhea and syphilis. About nine months ago digestive disturbances were noticed. These grew steadily worse and failed to respond to ordinary dietetic measures. Marked gaseous distention added to this discomfort. One day a sudden sharp pain was felt in the region of the epigastrium which was akin to the pain patients describe when a hollow viscus is ruptured. After the initial intensity the pain subsided and the general condition felt improved for a while. After a month it was noticed that slight exertion, such as walking upstairs, made me quite tired, and running was out of the question. Finding that rest improved the condition, I took as much rest as possible. The development of a thrombotic hemorrhoid caused me to consult a physician, who found fluid in the pleural and peritoneal cavities. X-ray confirmed this. Several quarts of pleural fluid were aspirated on the first day, and two quarts the next morning. Withdrawal of the pleural fluid seemed to cause the abdominal fluid to disappear, and it again returned as the pleural fluid accumulated.

Laboratory report by Doctor Glenn (September 20, 1929): Pleural fluid examined for ameba, echinococcus and bacilli of tuberculosis. The specimen consists of very turbid, pinkish gray, limpid fluid. Fresh and stained smears show no pus cells nor bacteria, but many red blood cells settled to the bottom. A small portion of this was treated with ether and shaken. The fluid promptly cleared and became an amber solution. A drop of fluid on a slide was stained with Sudan three and clear, stained fat droplets appeared.

Other examinations: The Wassermann was negative; the urine was negative. Blood count: white blood cells, 7300; small lymphocytes, 31; large, 6; polymorphonuclears, 61; transitionals, 2; hemoglobin, 76.

Conclusion: True chylous effusion, due either to trauma or, more likely, to pressure on the thoracic duct by a tumor mass.

ETIOLOGY

Chyle is lymph derived from the walls of the alimentary tract. Chylothorax is a condition in which the pleural cavity contains chyle. This condition results from a rupture of the thoracic duct or its radicals, or from a pathological condition in their walls, whereby the contents may be transuded into the pleural cavity. Trauma in some form is the most frequent cause. This often occurs in the upper part of the duct near its junction with the subclavian vein. Accidents of surgery in the lower cervical region, gun-shot wounds, or self-inflicted wounds may bring about this condition. Watts describes the case of a demented man who ran a knife into his suprasternal notch. Trauma of the lower portions of the duct may be caused by fracture of the vertebrae and ribs. Hypertrophic spurs may, during an accident, injure the duct, especially when it has lost its elasticity by some pathology about it. Such a case was described by Lindenberg of Germany. The next of importance are newgrowths, carci-

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noma especially; tuberculosis, or other enlargements of the lymph nodes, such as lymphosarcoma; thrombosis of the left subclavian vein; secondary growths in the duct itself; perforating lymphangitis; aneurysm of the duct itself and in one case aneurysm of the aorta; mitral disease; and cirrhosis of the liver, as referred to by Nichols. Warthin tells us that thrombosis of the duct itself is the complicating cause. This thrombosis may be due to causes already referred to or to Filariæ.

SYMPTOMS

Dyspnea and orthopnea, cough, pain in the epigastrium in some, and pain in the shoulders and back in others. The shifting of the symptoms is described in one case, making the clinician think of everything from filariæ to aneurysm. Vomiting of large amounts of chylous fluid was described by Lyter, who says this is the only case in the literature. Progressive weakness and loss of weight are common.

DIAGNOSIS

Most cases will now be picked up as was ours—by x-ray and exploratory puncture. The usual physical signs of fluid in the pleural cavity are present. Edema of the extremities is often present, and in our case there were dilated veins in the abdominal wall. Careful differentiation between true chyle and pseudo-chyle must be made. With true chyle there must be a lesion of the thoracic duct. Pseudo-chyle is not due to fat, but to a lecithin-globulin complex held in suspension by the inorganic salts present (Wallis and Scholberg). Some also describe a chyloform fluid due to fatty degeneration of cellular elements. Elliot warns against assuming that the milky fluid is pus. There is no odor to the fluid and it will remain in a container for weeks without becoming putrid. The rate with which the pleural cavity fills is important. The normal flow of lymph from the thoracic duct is from 130 to 195 cubic centimeters per hour (over three liters in twenty-four hours).

INCIDENCE

In making a diagnosis the incidence must be borne in mind. Lewin in 1916 was able to find only fifty-one cases of true chylothorax since the time of Bartolet, who is said to have described the first case in 1633. In 1918 Funk added three cases and Watts found three more, making fifty-eight cases up to April 5, 1921. Stewart and Linner in 1926 report a case of a new-born infant in which chylothorax began on the fourth day. Lyter in 1926 reports a case of a farmer who had a carcinomatous mass in the epigastrium obstructing the thoracic duct. Andrews, an ex-resident of the Mayo Clinic, reports a case which came under his observation in Lincoln, Nebraska—a man who had been pinned under an auto. Lindenberg of Germany reports a case of

a man who was caught between two coal cars. Paitre, in France, cites a case of a left-sided chylothorax.

The case here reported, then, is the sixty-sixth, so far as the writer can judge from the sources so far available.

Chyloascites is less rare. Watts says that the peritoneum is involved twice as often as the pleura. When the writer looked up the literature, he found most of the references dated before 1920, and he felt that something was wrong—the war most surely caused many cases because of trauma. The writer found the explanation in the remark that because of the protected position of the thoracic duct and its location near the great vessels, a bullet wound would also cause fatal hemorrhage. Elliott reports two cases from the war, after examination of one thousand chest wound records.

PROGNOSIS

Grave Zesas, in his review of cases, gives a 50 per cent mortality; Lindenberg of Germany gives more hope than this in the traumatic types and puts the mortality at 10 per cent. In most of the case histories which were reviewed death ensued in two or three weeks.

TREATMENT

The effort seems to have been in most of the patients to remove the chyle as fast as it formed, perhaps more often than the relief of dyspnea made necessary. In our patient, Doctor Crane and his consultant, Doctor McVey, decided not to withdraw the fluid unless imperative. If chyle is constantly aspirated death soon comes from starvation and inanition before adequate collateral chylous circulation can be formed. Lindenberg confirms this policy for traumatic cases by stating that the therapeutic intention should be to make the loss of chyle as little as possible—only when vital. Every puncture is a damaging factor as regards healing, since restored negative pressure caused by aspiration sucks at the wound and makes healing impossible. Lewin and also Hammessfahr of Germany both state that, as a result of negative pressure in the chest, chyle can escape into the pleura from the mediastinum through the normal intercellular spaces between the epithelial cells. Surgery, it seems, is highly impracticable in most cases. In our patient no history of trauma was found, and by gastro-intestinal and chest x-rays no definite etiology for the condition was noted. Fluid was removed five times—during September, ten quarts; October, three quarts; December, four quarts. On December 19, on the suggestion of Doctor Crane, the patient was empirically given a treatment with high voltage x-ray in the region of the lower mediastinum. He was instructed to return; but the treatment so upset his breathing and his stomach that for two or three weeks he was worse. Since that

time, however, he has markedly improved; he looks better, has gained in weight, eats well, and breathes more freely. Doctor Crane and I are inclined to believe that the treatment helped him, even though the reaction was intense. A recent examination of blood smears, collected by the patient at night, and examined by Doctor Glenn, reveal no *Filariae*. Films made February 18 show some lowering of the fluid level in the general pleural cavity, although the mediastinal shadow remains as before. Films made April 2 and April 22 show lowering of the general pleural effusion and decrease in the mediastinal shadow.

The writer wishes to thank Doctor Crane of Berkeley for the courtesy of letting him report this case. Dr. Charles McVey and Doctor Glenn of Oakland also gave valuable assistance.

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DISCUSSION

ROBERT A. GLENN, M. D. (The Samuel Merritt Hospital, Oakland).—One's first impression on observing this fluid was its apparent intensely purulent, hemorrhagic nature, yet it was free-flowing and exhibited no sedimentation. Our immediate suspicion of chylous effusion was made certain by microscopic and chemical study, as stated in the paper. Subsequent observations of fluid from the same case verified the original diagnosis. In the absence of any history of trauma one is inclined to believe in the probability of pressure exerted on the thoracic duct causing the effusion of chyle. The fact that one exposure to deep x-ray therapy was followed by an intense general reaction and a subsidence of the fluid level seems to support the opinion of the presence of a tumor, probably lymphomatous in nature, pressing on the duct. However, the history given in the paper of digestive disturbances, gaseous distention, etc., followed by a sudden onset of excruciating pain in the region of the epigastrium may indicate some acute disaster of an entirely different nature.

We have had the opportunity to observe this patient occasionally during the past year and he reports himself in excellent condition, without any respiratory distress, and attending his medical practice as usual.

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ROBERT S. STONE, M. D. (University of California Hospital, San Francisco).—Doctor Van Nuys has presented to us a very unusual case in a very interesting manner. Naturally, from the fact that he could find only sixty-six cases reported few, if any of us, will have had personal experience with this condition. It is therefore, of especial value to us to have Doctor Van Nuys share his experience with us.

The only point that I can make in a discussion of this report is to call the attention of the medical profession to the necessity for close coöperation between the roentgenologist and the physician referring the patient. Undoubtedly the x-ray appearance of this chest would suggest nothing more than an ordinary case of pleural effusion, but the roentgenologist being a trained physician was able, because of his medical training, to help interpret the x-ray findings in the light of the clinical findings. The day has gone by when the x-ray film should be used as a puzzle picture to the roentgenologist, put up by the physician with the spirit of tell me what is the matter with the patient from the film. This case of chylothorax reported by Doctor Van Nuys is an excellent example of just this point.

THE LURE OF MEDICAL HISTORY

GALEN: GREEK, MEDIEVALIST AND MODERN*

PART I

By SANFORD V. LARKEY, M. D.

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WHILE Galen's reputation rests largely on the nature of his authority in the Middle Ages and the resultant action to it brought about by the discoveries of Vesalius and Harvey, it should be pointed out that there are certain phases of his work, especially in experimental physiology, which bring him into much closer accord with modern science than is usually thought. I shall try to point out the philosophical trend of his thinking which so profoundly influenced medieval scholars, and, in contrast, will describe some of his experiments and his treatment of patients.

Galen was born in Pergamos, Asia Minor, in about 131 A. D., so this year is the eighteen hundredth anniversary of his birth. He was essentially Greek in his mode of thought, this in contrast to the more practical Romans, whose scientific achievements were best exemplified in their great aqueducts, baths, sewers, etc. His father, Nikon, an eminent architect, gave his son an excellent education, philosophical in nature. After the god Aesculapius had appeared to his father in a dream, he decided to study medicine and traveled widely. Among other places he visited Corinth and Alexandria, the latter the great medical center of his time, where there was a knowledge of human dissection. His own later work was done entirely on animals, and this accounts for many errors in his descriptions.

After serving as physician to the gladiators in his home city, he came to Rome where he achieved a great reputation, but due to the jealousy of his fellow practitioners he was forced to flee for his life. However, the emperor Marcus Aurelius recalled him to be court physician and tutor to his son Commodus. After a life of tremendous activity and amazing literary productivity, he died in 201.

Galen's particular genius consisted in correctly appreciating the essential features of his scientific inheritance. In a welter of conflicting ideas and theories, he based his medicine on Hippocrates and his biology on Aristotle. Thus he brought together the best elements in Greek medicine, an essential step in scientific progress. This systemization carried great weight in the Middle Ages, but it took along with it many fanciful speculations, which were considered equally authoritative, and which were not tested by experiment. In fact the method of experimental verification, urged but not always practiced by Aristotle and

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